Claims

1. A sensor arrangement (13.1) comprising a radiation-conducting substrate (13.9) which includes a first and a second surface (13.2, 13.3), wherein the first surface (13.2) is a radiation passage area through which radiation of a given wavelength range may be coupled into the substrate (13.9) as well as coupled out of the substrate (13.9), and the second surface (13.3) comprises

   - a plurality of sensor fields (13.4) which are designed to reflect radiation of the given wavelength range from the substrate (13.9), which is incident at a predetermined angle range, as well as

   - separating regions (13.5) for separating the individual sensor fields (13.4) from the respectively adjacent sensor fields (13.4), with said separating regions (13.5) being designed to absorb radiation of the given wavelength range from the substrate (13.9), which is incident at the predetermined angle range, so as to produce a contrast between the sensor fields (13.4) and the separating regions (13.5) in the radiation reflected at the sensor fields (13.4), and said separating regions (13.5) being formed by a separating agent layer (13.10) on the second surface (13.3) of the substrate (13.9),

   characterised in that

   the separating agent layer (13.10) causes a reflectivity lower than 0.5 for radiation of the given wavelength range from the substrate, which is incident at the predetermined angle range, at the interface between the separating agent layer (13.10) and the substrate (13.9), at least in a first region (13.8) adjacent to the interface between the separating agent layer (13.10) and the substrate (13.9), and

   the separating agent layer (13.10) causes an extinction higher than 0.95 for radiation of the given wavelength range, at least in a second region (13.7) located above the first region (13.8), on the side opposing the substrate (13.9).

2. The sensor arrangement according to claim 1, characterised in that the first and the second region (13.7, 13.8) form part of a unified layer (13.10).

3. The sensor arrangement according to claim 2, characterised in that the unified layer (13.10) comprises titanium or germanium.

4. The sensor arrangement according to claim 1, characterised in that the first region (13.8) forms part of a first layer (13.11) comprised by the separating agent layer (13.10), and the second region (13.7) forms part of a second layer (13.12) which is comprised by the separating agent layer (13.10) and is different from the first layer (13.11).

5. The sensor arrangement according to claim 4, characterised in that the first layer (13.11) comprises silicon or germanium.

6. The sensor arrangement according to one of claims 4 or 5, characterised in that the second layer (13.12) comprises germanium or a metal, preferably titanium or chromium.

7. The sensor arrangement according to one of claims 1 to 6, characterised in that the first and the second region (13.8, 13.7) each have a maximum thickness (D) of 1 μm.

8. The sensor arrangement according to one of claims 1 to 7, characterised in that the separating agent layer (13.10) has a maximum thickness (D) of 1 μm.

9. The sensor arrangement according to one of claims 1 to 8, characterised in that the second region (13.7) has a thickness (D) of more than 70 nm, preferably of more than 200 nm.

10. The sensor arrangement according to one of claims 1 to 9, characterised in that the first region (13.8) has a thickness (D) of more than 10 nm, preferably of more than 20 nm.

11. The sensor arrangement according to one of claims 1 to 11, characterised in that the first and the second region (13.8, 13.7) together have a minimum thickness (D) of 80 nm, preferably of no less than 100 nm, with a minimum of 200 nm being particularly preferred.

12. The sensor arrangement according to one of the preceding claims, characterised in that there are at least 100, preferably at least 1,000 sensor fields (13.4) arranged on the substrate (13.1).

13. The sensor arrangement according to one of the preceding claims, characterised in that each sensor field (13.4) has a surface area smaller than or equal to 6.2×10^{-4} cm^2.

14. The sensor arrangement according to one of the preceding claims, characterised in that the sensor fields (13.4) have a surface density larger than or equal to 250 fields per cm^2.

15. The sensor arrangement according to one of the preceding claims, characterised in that the substrate (13.9) is formed as a flat plate.

16. The sensor arrangement according to claim 15, characterised in that the flat plate has a total surface area smaller than or equal to 20 cm^2.

17. The sensor arrangement according to one of the preceding claims, characterised in that the sensor fields (13.4) comprise an SPR-suitable layer (13.6).

18. An optical measurement arrangement comprising:

a sensor arrangement according to one of claims 1 to 17,

an optical means (2.11, 2.12) for coupling radiation of the given wavelength range into the substrate (13.9) of the sensor arrangement via the first surface (13.2), at an angle within the predetermined angle range, and for coupling out the radiation reflected by the sensor fields (13.4),

a radiation source for supplying radiation of the given wavelength range to the optical means, and

a detector arranged to detect the radiation coupled out of the optical means and reflected by the sensor fields (13.4).

19. A method of manufacturing a sensor arrangement according to one of claims 1 to 17, comprising the step of:

forming a separating agent layer (13.10) on the substrate (13.9) such that free regions defining sensor fields (13.4) are created, with the separating agent layer (13.9) being applied by vapour deposition.

20. The method according to claim 19, comprising the further step of applying an SPR-suitable layer (13.6), at least in the free regions, to form the sensor fields (13.4).

21. The method according to claim 19 or 20, characterised in that the step of forming the separating agent layer (13.10) comprises

applying a structurable lacquer layer (6.3) on the substrate (6.4);

structuring the lacquer layer (6.3) to define the free regions, and removing the lacquer such that lacquer remains only in the area of the free regions;

vapour-depositing one or more first materials to form the first region (13.8) and subsequently one or more second materials to form the second region (13.7); and

carrying out a lift-off to lift off the coated lacquer present in the free regions so as to expose the substrate at the free regions.

22. The method according to claim 19 or 20, characterised in that the step of forming the separating agent layer (13.10) comprises

applying a structurable lacquer layer by means of a screen printing technique;

vapour-depositing one or more first materials to form the first region (13.8) and subsequently one or more second materials to form the second region (13.7);

carrying out a lift-off to lift off the coated lacquer present in the free regions so as to expose the substrate at the free regions.

23. The method according to claim 19 or 20, characterised in that the step of forming the separating agent layer (13.10) comprises

vapour-depositing the separating agent material homogeneously over the entire substrate (6.4);

protecting the later separating regions by means of structurable lacquer;

exposing the sensor fields by selectively etching and removing the protective lacquer.

24. The method according to one of claims 20 to 23, characterised in that the step of applying an SPR-suitable layer (13.6) comprises

    vapour-depositing an SPR-suitable layer (13.6), preferably of gold, on the free regions and the separating agent layer.

25. Method of depositing liquid samples (12.3) on a sensor arrangement (13.1) which includes a plurality of sensor fields (13.4) arranged in a grid that lies in a plane, comprising:

    depositing liquid drops (12.10) on an array of liquid receiving regions (12.9) lying in a plane, with each liquid receiving region (12.9) being surrounded by a liquid repelling region (12.8) consisting of a material that repels the liquid drops, such that the liquid samples are kept in the liquid receiving regions (12.9) in the form of drops of variable diameter, with the liquid receiving regions (12.9) being provided in a grid which is compatible with the grid of the sensor fields (13.4);

    immersing an array of transfer pins (12.1) into the liquid drops (12.10) on the liquid receiving regions (12.9) to wet the tips (12.6) of the transfer pins (12.1), with said transfer pins (12.1) being provided in a grid which is compatible with the grid of the sensor fields;

    extracting the wetted transfer pins (12.1) from the liquid drops (12.10);

    lowering the wetted transfer pins (12.1) over the sensor fields (13.4) so as to bring the liquid at the wetted transfer pins (12.1) into contact with the sensor fields (13.4).

26. The method according to claim 25, characterised in that the liquid repelling regions (12.8) have a maximum elevation of 200 μm with respect to the liquid receiving regions (12.9), preferably of 100 μm, with 30 μm being particularly preferred.

27. The method according to claim 25 or 26, characterised in that the transfer pins consist of wolfram carbide.